

REMARKS

Claims 5-22 are pending in this application. Applicant acknowledges the Office's acceptance of the drawings and receipt of all certified copies of the priority documents. Reconsideration of the subject patent application and allowance of the claims are respectfully requested in view of the following remarks.

Claim Rejections Under 37 C.F.R. §102

Claims 5-7, 10-13, 16-19, and 22 are rejected under 35 U.S.C. §102(b) as being anticipated by Saida *et al.* (U.S. Patent 5,674,611) (hereinafter referred to as "Saida"). The Examiner cites Saida as teaching a process for producing a copper clad laminate providing an insulation layer constituent material having a first and a second side, coating the first side with a first copper foil of a first thickness, coating the second side with a second copper foil of a second thickness to produce a first copper foil/insulation constituent material/second copper foil assembly, wherein the thickness of the second foil is greater than the thickness of the first foil, hot pressing the assembly to produce the laminate, wherein the first copper foil is not recrystallized during the hot pressing, and the second copper foil is recrystallized during the hot pressing. The Examiner further argues that Saida discloses the thickness of the second foil as four times or less than the thickness of the first foil, the insulation layer constituent material is a resin, and after hot pressing the Young's modulus of the first copper foil is 1.1 times more than the Young's modulus of the second copper foil.

Applicant respectfully disagrees that claims 5-7, 10-13, 16-19, and 22 are anticipated by Saida. In order for a proper anticipation rejection to have merit, the reference cited must describe each and every limitation of the claims. *See* MPEP § 2131.01. Saida fails to disclose each and every limitation of the claims of the present invention because Saida does not specifically refer to "recrystallization" of a second copper foil during hot pressing. The Examiner points to column 1, lines 10-54 for support that Saida discloses recrystallization during hot pressing. Applicant agrees that all metals possess recrystallization properties. However, in the present invention, the

first and second copper foils should be used in a distinct and separate manner in terms of metal composition. These metals include one metal that is easily recrystallized and one metal that is difficult to recrystallize in an electrodeposited copper foil. An example of an electrodeposited copper foil that recrystallizes easily is an S-HTE foil. The S-HTE foil recrystallizes readily when heat treatment is carried out under conditions of 180° C and 60 minutes and is known in the art as disclosed in EP 0207244 B2 and U.S. 6,479,170 B2 (copies attached). Saida fails to teach the use of an electrodeposited copper foil such as an S-HTE foil that recrystallizes easily.

Independent claims 5, 11, 17 and claims 6, 7, 10, 12-13, 16, 18-19, 22 dependent thereon require that the first copper foil not be recrystallized during hot pressing, the second foil is to be recrystallized during hot pressing, and the second copper foil is greater in thickness than the first copper foil. The term “recrystallized” as claimed relates to a physical property of the copper foil itself. As described in the present specification, a copper foil incorporating strain within the copper foil (i.e., a rolled copper foil and an electrodeposited copper foil referred to as S-HTE) will likely cause a recovery phenomenon when heated, and new crystals free from strains will be easily generated. Both the rolled copper foil and S-HTE copper foil are copper foils that are easily recrystallized. The present invention exemplifies the rolled copper foil and electrodeposited copper foil as “recrystallizable” copper foils.

The Examiner is correct that Saida discloses a double-sided copper clad laminate. However, Saida does not specifically teach a relationship between the thickness of the first copper foil and the second copper foil in the formation of the double-sided copper clad laminate. There is no teaching in Saida concerning physical properties of a double-sided copper foil which constitute a double-sided copper clad laminate of the present invention. Applicant respectfully disagrees with the Examiner’s interpretation of Saida at column 5, lines 9-16. The Examiner argues that Saida discloses at column 5, lines 9-16 a thickness of a copper foil and at column 6, a thickness of a second copper foil. Notably, Saida discloses at column 5, lines 9-16 a thickness of a copper foil used for an adhesive, e.g., 9-100µm (emphasis added). At column 6, lines 15-32,

Saida discloses a thickness of a copper foil, e.g., 35 μ m, of a single-sided copper clad laminate formed according to Example 1 (emphasis added). Saida fails to teach anything about what the thickness of the first and second copper foils should be in forming a double-sided copper clad laminate, nor does Saida disclose using a copper foil having a physical property that can be easily recrystallized.

Additionally, the Examiner asserts that Saida discloses at column 5, lines 9-52 that the Young's modulus of the first copper foil is 1.1 times more than the Young's modulus of the second copper foil. However it is difficult to see such a description concerning the Young's modulus, because the paragraphs only teach a preferable thickness of a copper foil to be used as a copper foil with an adhesive, an adhesive composition (Example 1), and formation of a clad laminate with the use of the adhesive composition, the 35 μ m-electrodeposited copper foil, and the glass epoxy prepreg. Thus, Saida only teaches a general method of producing a clad laminate, an adhesive to be used for a substrate, or a copper foil with an adhesive, and there is no teaching about the physical property of copper foils to be positioned on the both sides of the double-sided copper clad laminate or any relationship between the first and second copper foils. Furthermore, for the record Applicant's counsel discussed the Young's Modulus and the Saida reference during a telephone conversation with the Examiner on March 23, 2006. During that telephone conversation, the Examiner acknowledged that Saida fails to specifically teach the Young's modulus values. Applicant, therefore, respectfully requests that the finality of the Office Action be withdrawn in view of this conversation.

Applicant, therefore, submits that claims 5-7, 10-13, 16-19, and 22 are not anticipated by Saida because Saida fails to disclose each and every claim limitation of the present invention. Applicant respectfully requests that the rejection on this basis be withdrawn.

Claim Rejections under 35 U.S.C. §103

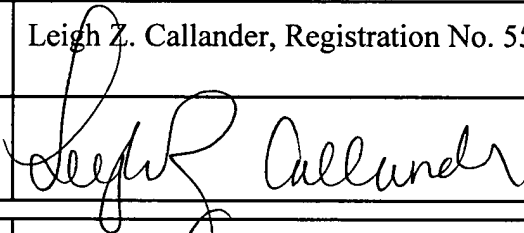
Claims 8, 9, 14, 15, 20 and 21 are rejected under 35 U.S.C. §103(a) as being unpatentable over Saida. The Examiner argues that Saida discloses a second copper foil contracting at a certain percentage under pressing conditions of 170° and 60 minutes but acknowledges that Saida does not explicitly disclose that the second copper foil contracts about 0.05% under pressing conditions of 180° and 60 minutes. However, the Examiner argues that there is no evidence indicating the contracting percentage and the pressing conditions range of the second copper foil are critical and refers to the MPEP as stating that it is not inventive to discover the optimum or workable percentage/range of a result-effective variable within given prior art conditions by routine experimentation. The Examiner also argues that the specification contains no disclosure of either the critical nature of the claimed dimensions or any unexpected results. Where patentability is said to be based upon particular chosen dimensions or upon a variable recited in a claim, the Examiner argues that the applicant must show that the chosen dimensions are critical. Finally, the Examiner argues that it was well-known to one of ordinary skill in the art at the time of the invention was made that the second copper foil may be a S-HTE foil.

Applicant respectfully disagrees that claim 8, 9, 14, 15, 20, and 21 are unpatentable over Saida. These claims are dependent on claims 5, 11, and 17 and incorporate all their limitations. As Applicant asserts that claims 5, 11, and 17 are in condition for allowance, Applicant also submits that claims 8, 9, 14, 15, 20, and 21 are patentable. Furthermore, nowhere does Saida disclose or suggest that a second copper foil with a thickness greater than that of a first copper foil contracts to a larger extent than the first copper foil during hot pressing. The contraction properties disclosed and claimed in the present invention are the opposite from what one of

ordinary skill in the art would expect. Nowhere does Saida teach that the first copper foil is not recrystallized during hot pressing and the second copper foil is recrystallized during hot pressing. Applicant submits there is no teaching or even a hint that would allow a person of ordinary skill in the art to achieve the invention as claimed in the present invention. Pages 9-10 of the present specification indicate that a thicker copper foil is expected to contract more than a thinner copper foil. This leads to warping in a copper clad laminate with copper foils of different thicknesses. When the laminate of the copper foil/insulation layer constituent material/copper foil structure is hot-pressed, each layer can freely expand or contract to an extent determined by quantity of heat supplied, so long as it remains liquid before the insulation layer constituent resin is cured. But the expansion or contraction behavior is limited resulting from differences between the adjacent layers in thermal expansion or contraction as the insulation layer constituent resin is cured. (See Specification page 5). The present invention remedies potential warping by lowering the Young's modulus of the thicker copper foil to minimize its contraction in relation to the thinner copper foil. When thermally treated under the conditions of 180° and 60 minutes, the S-HTE foil has a lower Young's modulus of around 40 to 50 GPa as compared with around 55 to 60 GPa of the copper foil common in the art.

In summary, Saida is completely silent and provides no motivation or suggestion to arrive at the present invention. Saida is silent as to a second copper foil having a thickness greater than that of a first copper foil thereby allowing the second copper foil to contract to a larger extent than the first copper foil during hot pressing. Saida also fails to suggest not recrystallizing the first copper foil during hot pressing, but recrystallizing the second copper foil during hot pressing. Because there is no suggestion or teaching in Saida to allow one of ordinary skill in the art to arrive at the present invention, Applicant submits that claims 8, 9, 14, 15, 20, and 21 are not obvious in view of Saida. Applicant, therefore, respectfully requests that the rejection on this basis be withdrawn.

In view of the above remarks, Applicant submits that the present application is now in condition for allowance. Reconsideration and favorable action are requested. The Examiner is invited to telephone the undersigned to expedite allowance of this application.

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